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ABSTRACT

The development of education parallels the growth patterns in technology and science. The three stages of growth in education are characterized by: (1) class teaching, (2) group teaching, and (3) independent study. Stage 1 is teacher-dominated. At stage 2 the instructor is more passive in the control of a group. Stage 3 is the most meaningful because there is student involvement in the learning process and feedback is provided to the instructor. A model such as this can contribute to a rationale for decision-making in education, showing that growth toward a technology of instruction requires a pattern of change and is not just a matter of changing a number of discrete and isolated factors. (Author/DS)

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International Council for Educational Media
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TOWARD A DEFINITION OF RESOURCE BASED LEARNING

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A definition of resource based learning is no less complex to develop than a definition of education. This, however, does not mean that the search for a definition should not be conducted, but that the search is more likely to be fruitful if we extend the parameters to include an examination of the role of resources in education and the overall role of education in society.

There are many ways to start a search of this nature but for the purposes of this presentation, we will begin with an examination of the evolution of technology and science, both major resources which man has discovered, invented and created. The examination will show the relationship of these material and intellectual developments to education, the nature and direction of the changes which are taking place, and the implications for resource based learning.

New resources and technologies have been bringing about changes in society since the beginning of time. The evolution of technologies has been accompanied by a parallel evolution of scientific principles and each has contributed to the eventual transformations of our society through the nomadic, agricultural, industrial and technological eras.

Each of these changes created opportunities for people to do things in new ways; but in order to make effective use of the new resources, individuals, groups and societies had to organize differently. New goals were introduced and old ones given less emphasis but not without a considerable amount of strain on customs, values and belief systems. Traditional attitudes, approaches and institutions have been very slow to adapt to change.

As educators, we are aware of the increasing pace of change in technological developments and that this is creating confusion and, as Drucker contends, an age of discontinuities. Much of the confusion is through not knowing where to direct our energies nor what the consequences of our actions may be. As a first step toward handling this dilemma, we will examine the growth patterns in technology and science.

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The Growth Patterns of Technology and Science

An examination of the progressive changes in the technologies of transportation, power and industry shows that a series or pattern of developments is readily observable. Within each series there are several steps. These have been depicted below in a three-stage or triadic format.

Stage I	Stage II	Stage III
Wheel	Motor	Jet Propulsion
Manpower	Machine Power	Electronic Controls
Cottage Industry	Mechanization	Automation

Within the field of science the developments involve abstractions which are not as readily perceived as the more concrete steps in technology. Nevertheless, there does seem to be a parallel progression of developments as can be seen in such triads as:

Stage I	Stage II	Stage III
Certainties	Confusion	Probabilities
Linear Sets	Rationalized Structures	Emerging Patterns
Closed System	Open System	Organic Systems

While each of these triads could be individually criticized since they are high level abstractions, it does seem there is a sufficient basis here for continued investigation. The addition of further triads reveals the model's structure and makes more evident a vertical relationship among the members which warrants the categorization into stages of development.

The type of change from Stage I to Stage II and then to Stage III has particular relevance. From this model it would appear that the nature of change is sequential and that the type of emergence from one stage to another is transformational.

The nature of change is of kind as well as degree. It is more than adding a dimension in a static manner. It is dynamic. The dynamism of increasing dimensions changes all the operating relationships. This type of change is such that it is not readily perceived, but if educators are to predict and determine the probability of future trends in education it is important to understand the nature of change and its implications.

One of the most significant implications revealed by an examination of growth in technology and science is that the scientific principles which are developed in an era are not only required but are essential for the creative use and general control of the technology of that era.

Attempts to use the principles of an earlier period with the new technology result in a systems mis-match and pollution. The closed system approach is inadequate for problems of the future; certainties must give way to probabilities.

In order to come to grips with this problem, national systems of education will have to provide ways to assist students to move beyond cause and effect linear thinking; to understand, use and internalize such non-linear scientific principles as probability, relativity and organic systems -- the alternative is mental stagnation and intellectual pollution.

To demonstrate how this change can be implemented, the concept of transformational change, derived from technology and science, will now be applied to education.

Growth Patterns in Education

In the literature on developments in education, the sequential, emerging, and transformational nature of change is not clearly depicted. Why? Is it because educators have grown so accustomed to thinking in dualistic terms of "mind and matter," "good and evil," that they have accepted such polarities as "traditional and progressive?" - or "teacher-dominated and child-centered?" It is hypothesized that using the three-step approach to change represented in the model could break the custom of polarized thinking and make possible predictions of the nature and direction of change in education.

Within the field of education the first polar set examined was teacher-dominated versus child-centered. A third part to the set was sought until it was realized that a polar set is a complete set. It was necessary to start afresh and develop a new approach using the old generalization as a guide only. The new continuum developed to depict sequential, emergent, and transformational change was the triad "teacher-dominated/permissive/inquiry-centered." From the literature of mental hygiene the triad of "doing things to/doing things for/doing things with" people was chosen. It seemed to fit the model as did the triad "teaching aids/audiovisual techniques/instructional technology."

Further educational triads were developed over a period of time. They were placed in the model under the subheadings of Principles, Practices, or Outcomes in order to highlight the interacting relationship among these three phases of the educational process. The labels chosen in the triads are abstract and general. Through critical examination of the processes of education such terms as those below and those in the other triads in the model may be operationally defined.

Stage I	Stage II	Stage III
Class Teaching	Group Teaching	Independent Study
Standards Grouping	Age Grouping	Readiness Grouping
Extrinsic Manipulation	Random Reinforcement	Meaningful Involvement

Examination of the model reveals that an increased amount of organization and control is required at the Stage III level; but it is a different type of control from that of the earlier stages.

A Model Depicting Change as Sequential, Emergent and Transformational

Stage I	Stage II	Stage III
	Developments in Technology	
wheel	motor	jet propulsion
manpower	machine power	electronic controls
cottage industry	mechanization	automation
structures and functions	functions in structures	structures for functions
units	networks	constellations
explore	exploit	conserve
	Developments in Science	
certainties	confusion	probabilities
absolutes	relative absolutes	relatives
metaphor	toward models	functional models
linear sets	rationalized structures	emerging patterns
closed system	open system	organic systems
static	dynamic (in flux)	dynamic (evolving)
	Developments in Education	
Principles		
active mind	reactive mind	transactive mind
unity (dualism)	unity (monism)	pluralism
autocratic	laissez-faire	democratic
Practices		
teacher dominated	permissive	inquiry centered
do things to	do things for	do things with
subject emphasis	method emphasis	discipline emphasis
product oriented	process oriented	performance oriented
extrinsic manipulation	random reinforcement	meaningful involvement
standards grouping	age grouping	readiness grouping
class teaching	group teaching	independent study
fixed stimulus	multiple stimuli	organized stimuli
limited access	random access	systematic access
limited resources	multiple resources	instructional systems
teaching aids	audiovisual techniques	instructional technology
Outcomes		
fixed response	varied response	response mastery
convergent thinking and rote memory	convergent thinking plus free expression	convergent and divergent thinking
competitive	cooperative	adventure
inner directed	other directed	self actualizing

As the model shows, the move is away from autocratic and laissez-faire toward democratic control; from doing things "to" or "for," to doing things "with" students. Through this type of increased control responsible freedom is more attainable. It is significant that it is this move toward independent study with its emphasis on readiness, involvement, inquiry, and the use of learning resources that is most likely to produce outcomes such as response mastery, adventure, and self-actualization. This concept of growth requires a greater understanding of the individual in society and a recognition of which outcomes an educational system has some control over.

It is hypothesized that a model such as this can contribute to a rationale for decision-making in education which earlier pendulum-swing models obscured. The model shows that growth toward a technology of instruction for the betterment of mankind requires a pattern of change and is not just a matter of changing a number of discrete and isolated factors. By thus relating many interdependent variables, the model highlights the way in which educational principles, practices and outcomes are related to and determined by the emerging stages of growth in a technological society.

Implications for Education and Resource Based Learning

In broad general terms, the progression from Stage I to Stage III reflects the growth from agricultural through industrial to our technological society. What becomes evident is that there is a considerable "cultural lag" which negatively influences growth in all institutions, particularly in this case, education. There can be no complete break with the past, so while the stages may be shown as distinct and separate, they, in fact, overlap and operate concurrently.

Educators characteristically gravitate to one stage or another depending upon experience and attitudes. Whatever the emphasis, it is assumed there can be movement in either direction -- toward adventure and risk in the future or a regression toward the psychological security of the past. Stage I incorporates the traditions of the past and reinforces the dependency syndrome in students. In Stage II, concerns are with the processes of the present and reinforcement of independence in students; while in Stage III, the new focus is upon outcomes in the future and interdependence.

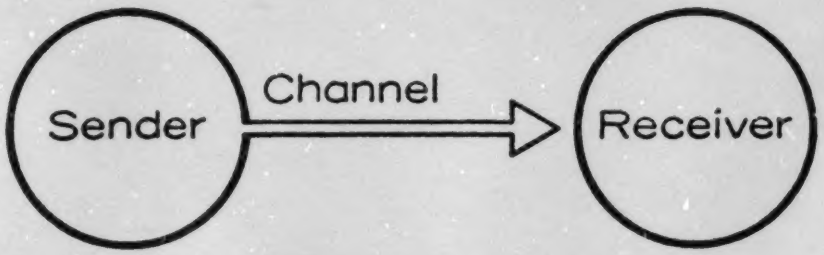
There are no definitive measures available, but a general consensus from over a hundred groups which have discussed the model indicates that probably 70% of education is at the Stage I level, about 25% at Stage II and perhaps 5% at Stage III. Naturally, these figures are only indications and would not apply in all places at all levels.

The following comments highlight the style of education carried out at each of the stages and describe the type of communications model and role of resources model used within each pattern or system. A brief summary is included to depict the types of service emphasis expected at each level.

Stage I

At this level education is in general teacher-dominated and the teacher is traditionally expected to transfer the cultural heritage by transmitting information and thus maintain the status quo. Students are expected to rise to meet the challenges arbitrarily set by the teacher. Because the teacher's task is mainly passing on what he knows, there is little demand for learning resources to expand the students' horizons. Within the classroom there is an emphasis on logical thinking and rote memory and reliance upon talk and chalk.

The basic "sender-channel-receiver" model seems to be adequate in this situation where there is a preponderance of one-way communication.



This might be termed the "Audio Visual Aids" level with a limited use of films, slides, tapes and other media on a casual or piecemeal basis.

Support Service Tasks. The basic operations are centered in the procurement, provision and maintenance of media. The responsibilities include providing service as guardians and housekeepers, as selectors and evaluators to provide the needed equipment and materials. More specifically the roles include:

Obtaining and providing films, filmstrips, tapes, recordings and other commercial or sponsored media.
Making available equipment and distribution services.
Making charts, slides and transparencies according to instructor requests; mainly copy work.
Taping television programs for transmission to classes.
Support services such as installing public address systems.
Maintenance of equipment, materials and facilities.

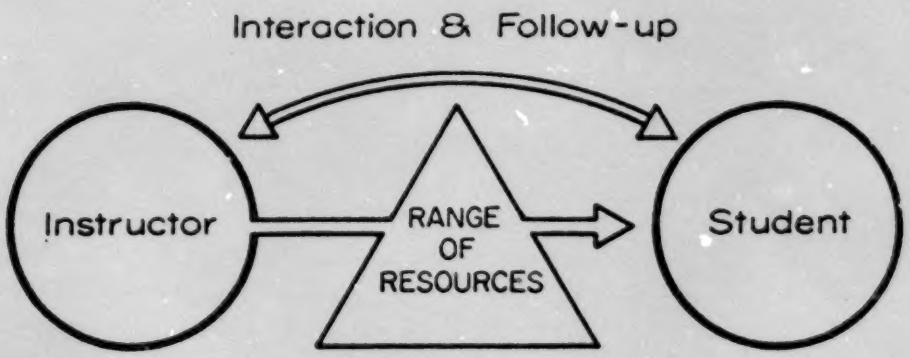
It is important that the support services or "housekeeping" operations facilitate the use of media in the instructional program and do not inhibit or restrict development. A start can be made to help faculty to use the "right tool in the right way for the right occasion."

Stage II

Here we find instructors who typically do not stand so much in the foreground and are more permissive in their control of their classes. The emphasis has changed from "doing things to" the student to "doing things for" them. The orientation is toward process with a wide range of resources and facilities to carry out part of the teaching and assist student learning.

The emphasis on logical thinking is reduced and an acceptance of free expression and a recognition that there can be more than one right answer is developed. One of the general outcomes of this stage is an apparent growth in cooperativeness and a diminishing of competitiveness among students. This may in part be a result of increased concentration on providing students with positive rather than negative reinforcement. For example, instructors are generally more accepting of contributions and less critical as students try to develop skills and ideas.

A model which highlights the necessity for a wide range of experiences and emphasizes the need for followup to make presentations more effective could be illustrated as shown for the type of two-way communication instructors feel is needed to be effective.



This could be referred to as the stage of "Audio Visual Techniques." In this category there is utilization of an extensive range of resources which would include films, slides, transparencies, tapes, recordings, charts, models, demonstrations, field trips, television and dramatization. The range has been classified by Dale as a "Cone of Experience." The resources are used to enrich the learning experience for the student.

Support Service Tasks. At this level of operation the development and provision of a much wider range of instructional services and learning resources through media are added to the previous tasks. The increased activity revolves around

improving media, production, utilization and the conditions for learning through consultation, workshops, expanded collections of media, improved facilities and well organized distribution systems. Media utilization involves the cross media and multi-media approach with increased involvement in local production of media to meet student needs.

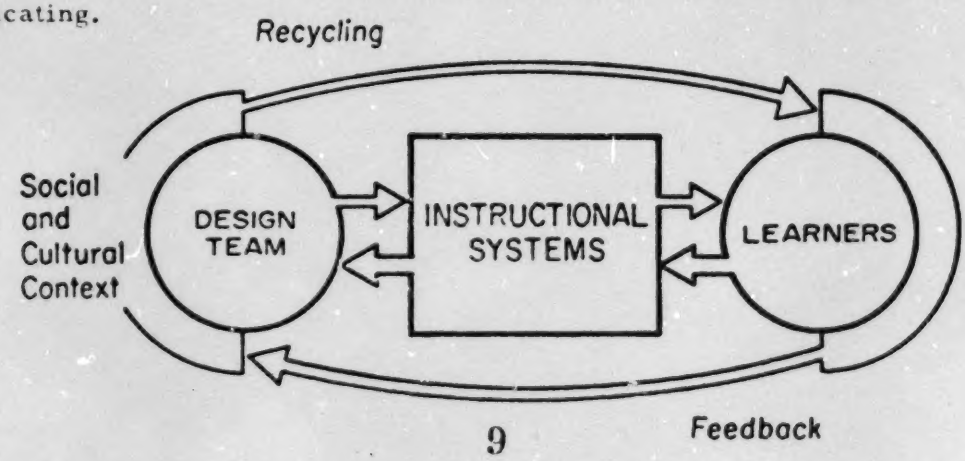
Stage III

We move now into a stage, setting or system if you wish, which could be called "inquiry centered." Here the instructor requires assistance in his role as a diagnostician and educational designer with the learner. Permissiveness gives way to organized inquiry, and sporadic access to resources is replaced by instructional systems. So that student performance can be improved and an operational level of mastery reached, more time is needed to determine readiness and develop a more meaningful student involvement in the learning program.

The students are recognized as being increasingly in search of moral as well as intellectual truths. There is also a recognition that productive thinking requires a balancing of logical thinking with creative thinking. Through programs developed to meet these complexities, the learner is given opportunities to meet his objectives; for self-determination, he is encouraged to accept more responsibility for independent learning and to become more active in his role as a problem solver.

A different communication model is shown below which recognizes that the instructional design team and the learners operate from contexts which are different socially and culturally. The model includes feedback and recycling mechanisms which operate continuously between the communicators, through the systems they design, and their societal systems. This interaction is essential if we are to organize or plan situations which will be conducive to self actualizing for both the instructors and the students.

Feedback from the student provides the educator with information on what the student feels he requires to help him reach agreed-upon operational objectives. The recycling that is carried out is a transaction which affects objectives, strategies and outcomes - not just the strategies. This model also recognizes the diversity of knowledge, skills and values of participants in learning and thus recognizes the need for both teacher and learner to search for truths through communicating.



This could be referred to as the "instructional technology" stage and can call upon the technologies of mass instruction, individual instruction and instructional systems. Besides television, film series, electronic learning centers, teaching machines, computer assisted instruction, instructional kitsets and audio-tutorial laboratories, we find such activities as games and simulation are available to be used within our educational programs in a systematic way geared to helping the learner reach his objectives.

Instructional technology can be defined as a systematic way of designing, carrying out and evaluating the total process of learning and teaching in terms of specific objectives, based on research in human learning and communication, and employing a combination of human and non-human resources to bring about more effective instruction. (McMurrin, 1970)

Support Service Tasks. Effective operations now require specialists who can contribute their skills to a "systems approach" to curriculum and instruction. This approach involves an analysis of instructional needs and learning tasks, cooperative designing and developing of alternate programs, and also evaluating outcomes and performance in programs where media are used as an integral part of instruction. Now the Support Service includes an instructional design and development service which works in a cooperative manner with subject matter specialists, facilities designers and others who may be necessary to develop and implement new curriculum programs in a systematic way.

The Challenge

Resource based learning and the instructional technology process offer an opportunity for all teachers to become more professional and improve the quality of education. As participants in this conference with a special interest in media, our challenge is to look beyond resources as media units and see them as part of the total process of education with a potential to influence learning in different ways.

The research base we draw upon as we move toward a definition of resource based learning draws upon many areas, both within and beyond the field of education. Such writers as Bloom, Bruner, Dewey, Gagne, Maslow and Skinner have provided significant contributions to educational literature on the American continent. In addition, principles from such areas as Cybernetics, Games Theory, Law of Probability, Information Theory, Communications and General Systems should also be examined in building a definition.

The misuse of technology could condition young people to live in a world of conformity and alienation. Therefore, it is our professional challenge to demonstrate how technological and intellectual resources can be used as forces to move young people toward creativity, a spirit of adventure, and a sense of community.

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